The conventional approach to research by students follows the sequence:

* Prerequisite requirement: personal skills
* Planning
* Gathering data (evidence)

i.e Conducting the research

* Processing data
* Drawing conclusions
* Evaluating the research

We usually ask students to follow these steps in reporting:

* Aim
* Hypothesis
* Method
* Results
* Conclusion
* (Discussion)

The following tables list the standards which can be met under the general headings listed above. This may aid the teacher in designing a sequenced assessment rubric for a task.

Notice that not all of the prescribed enquiry standards are addressed (see table on last page).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| METHODS OF SCIENTIFIC INVESTIGATION AND RESEARCH | | | | |
| Planning | | | | |
| Standards and aspects assessed | Below the standard | Approaching the standard | Meets the standard | Exceeds the standard |
| 1.1 Identification of a focused research question | | | | |
|  |  |  |  |  |
| 1.3 Identifying and controlling variables | | | | |
|  |  |  |  |  |
| 1.2 Make predictions directly related to a research question | | | | |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Obtaining and processing evidence | | | | |
| Standards and aspects assessed | Below the standard | Approaching the standard | Meets the standard | Exceeds the standard |
| 4.1 Select and use correctly and competently the appropriate equipment and materials for an investigation, with due regard for the safety of self and others | | | | |
|  |  |  |  |  |
| 3.1 Record raw data appropriately in a manner that allows easy interpretation | | | | |
|  |  |  |  |  |
| 3.2 Process raw data by the most appropriate means | | | | |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Conclusion and evaluation | | | | |
| Standards and aspects assessed | Below the standard | Approaching the standard | Meets the standard | Exceeds the standard |
| 3.3 Draw valid conclusions allowing for errors and uncertainties | | | | |
|  |  |  |  |  |
| 1.5 Identifying weaknesses and developing realistic strategies for improvement | | | | |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Research | | | | |
| Standards and aspects assessed | Below the standard | Approaching the standard | Meets the standard | Exceeds the standard |
| 3.4 Use an appropriate range of methods to communicate scientific information | | | | |
|  |  |  |  |  |
| 1.8 Identify and make critical use of secondary information | | | | |
|  |  |  |  |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Personal skills | | | | |
| Standards and aspects assessed | Below the standard | Approaching the standard | Meets the standard | Exceeds the standard |
| 1.4 Work constructively and adaptively with others as a team an a scientific investigation | | | | |
|  |  |  |  |  |
| 1.7 Work in an ethical manner with regard to living things in the environment | | | | |
|  |  |  |  |  |
| 1.6 Work in an ethical manner with regard to acknowledging data sources | | | | |
|  |  |  |  |  |

|  |  |  |
| --- | --- | --- |
| **SCIENTIFIC ENQUIRY – PRESCRIBED STANDARDS** | **METHODS OF SCIENTIFIC INVESTIGATION AND RESEARCH – ADAPTED STANDARDS** | **CATEGORY** |
| 1.1 Identify and develop a clearly focused research question | 1.1 Identification of a focused research question | **PLANNING** |
| 1.2 Make predictions directly related to a research question | 1.2 Make predictions directly related to a research question |
| 1.3 Identify and control variables | 1.3 Identifying and controlling variables |
| 1.4 Work constructively and adaptively with others as a team on a scientific investigation | 1.4 Work constructively and adaptively with others as a team an a scientific investigation | **PERSONAL SKILLS** |
| 1.5 Evaluate experimental design, identify weaknesses and develop realistic strategies for improvement | 1.5 Identifying weaknesses and developing realistic strategies for improvement | **CONCLUSION AND EVALUATION** |
| 1.6 Work in an ethical manner with regard to acknowledging data sources and authenticity of results | 1.6 Work in an ethical manner with regard to acknowledging data sources | **PERSONAL SKILLS** |
| 1.7 Work in an ethical manner with regard to living things and the environment | 1.7 Work in an ethical manner with regard to living things in the environment |
| 1.8 Identify, and make critical use of, secondary information | 1.8 Identify and make critical use of secondary information | **RESEARCH** |
| 2.1 Understand the historical developments of the major scientific ideas |  |  |
| 2.2 Know how scientists disseminate their ideas and results to encourage discussion and further development |  |  |
| 2.3 Know that science can bring great advantages to humanity but can also cause considerable damage to the environment |  |  |
| 3.1 Record raw data appropriately in a manner that allows easy interpretation | 3.1 Record raw data appropriately in a manner that allows easy interpretation | **OBTAINING AND PROCESSING EVIDENCE** |
| 3.2 Process raw data by the most appropriate means | 3.2 Process raw data by the most appropriate means |
| 3.3 Draw valid conclusions, allowing for errors and uncertainties | 3.3 Use an appropriate range of methods to communicate scientific information | **CONCLUSION AND EVALUATION** |
| 3.4 Use an appropriate range of methods to communicate scientific information | 3.4 Use an appropriate range of methods to communicate scientific information | **RESEARCH** |
| 4.1 Select and use correctly and competently the appropriate equipment and materials for an investigation, with due regard for the safety of self and others | 4.1 Select and use correctly and competently the appropriate equipment and materials for an investigation, with due regard for the safety of self and others | **OBTAINING AND PROCESSING EVIDENCE** |
| 4.2 Follow instructions accurately but be able to adapt to unforeseen circumstances |  |  |